

What is claimed is:

1. A wireless communication system for performing measurements and positioning of objects in a given area, said system comprised of:
  - 5 - at least one field beacon positioned at a target object;
  - a central signal collector, comprised of at least three base beacons assembled in a polygon design of known dimensions, wherein each base beacon communicates with each of the field beacons;
  - an application software, wherein said software performs measurement calculations based on communication signal characteristics between the field beacons and the base beacons of the central collector.
- 10 2. The system of claim 1 wherein the measurements calculation method is determined according to the geometrical shape of target objects.
3. The system of claim 2 wherein the geometrical shape is a surface, including at least three beacons.
- 15 4. The system of claim 2 wherein the geometrical shape is an opening, including at least three beacons.
5. The system of claim 1 wherein the central signal collector position is initialized by a GPS device.
- 20 6. The system of claim 1 wherein the central signal collector position is initialized by at least one field beacon applied to the three reference points with known coordinates.
7. The system of claim 1 wherein the central signal collector position is initialized in relation to at least three non-coplanar field beacons.

8. The system of claim 1 wherein the field beacons are positioned at different spaces within a building wherein the central signal collector is moved sequentially from one space to another for each measurement session.
9. The system of claim 1 further including an additional central signal collector for increasing measurement accuracy and for expanding the range of communication reception.
- 5 10. The system of claim 1 wherein the field beacons communicate with each other, enabling the creation of ad hoc signal collectors for improving measurements calculation accuracy and for expanding the range of communication reception.
11. The system of claim 10 wherein at least three field beacons function as a relay station 10 enabling communication between distanced beacons which are not in the communication range of the central collector.
12. The system of claim 1 wherein the field beacons and the base beacons communicate through RF signals wherein the distance measurements are based on RF signal properties.
13. The system of claim 1 wherein the field beacons and the base beacons communicate 15 through ultrasonic signals, wherein the distance measurements are based on the signals' time properties.
14. The system of claim 1 wherein the field beacons and the base beacons communicate through laser signals, wherein the field beacons are bar-coded and the central signal device is a laser scanner.
- 20 15. The system of claim 1 wherein the measurement calculations are used for generating computerized drawings of a target structure.
16. The system of claim 1 wherein the measurement calculations are used for surveying an existing structure for the purpose of creating as-built drawings.

17. The system of claim 1 wherein the measurement calculations are used for surveying surroundings before construction, wherein the field beacons are positioned at strategic locations, enabling the determination of the topographic relations between the beacons.

18. The system of claim 1 wherein the measurement calculations are used for surveying 5 surroundings under construction, wherein the field beacons are positioned at strategic locations, enabling the comparison between on-location positioning and construction designs.

19. The system of claim 1 wherein field beacons are embedded into building for future maintenance or monitoring use.

10 20. The system of claim 1 wherein the central collector's base beacons are set at permanent positions within a building, enabling the identification of objects' exact position and objects' movement within the building, wherein at least one field beacon is positioned on every identified object.

15 21. The system of claim 20 wherein the exact position or movement of the identified objects is incorporated within a three-dimensional visual model of the building.

22. The system of claim 20 wherein the objects are inventory items and the measurements calculation supports warehouse inventory management.

23. The system of claim 1 further including three field beacon triangle structure which is connected to a pointing telescopic rod of a known length enabling to measure any 20 target point.

24. The system of claim 1 including three field beacon triangle structure which is connected to a laser-based distance measuring device to measure any target point.

25. A wireless method for performing measurements and positioning of objects in a given 25 area using at least one field beacon positioned at a target object and a central signal

collector comprised of at least three base beacons assembled in a polygon design of known dimensions, said method comprising the steps of:

- establishing communication between each of the base beacons and each of the field beacons;
- 5 performing measurement calculations based on communication signal characteristics between the field beacons and the base beacons of the central collector.

26. The method of claim 25 further comprising the step of initializing the central signal collector by at least one field beacon which is applied to three reference points with known coordinates.

10 27. The method of claim 25 further comprising the step of initializing the central signal collector in relation to at least three non-coplanar field beacons.

28. The method of claim 25 further comprising the step of initializing the central signal collector using a GPS device.

15 29. The method of claim 25 further comprising the step of communication between the field beacons themselves, enabling the creation of ad hoc signal collectors for improving measurements calculation accuracy and for expanding the range of communication reception.

30. The method of claim 25 further comprising the step of relaying communication by the field beacons enabling communication between distanced beacons which are not in the 20 communication range of the central collector.

31. The method of claim 25 further comprising the step of generating computerized drawings of a target structure based on the measurement calculations.

32. The method of claim 25 further comprising the step of surveying an existing structure for the purpose of creating as-built drawings based on the measurement calculations.

33. The method of claim 25 further comprising the step of surveying surroundings before construction based on the measurement calculations, wherein the field beacons are positioned at strategic locations, enabling the determination of the topographic relations between the beacons.

5 34. The method of claim 25 further comprising the step of surveying surroundings under construction based on the measurement calculations, wherein the field beacons are positioned at strategic locations, enabling the comparison between on-location positioning and construction designs.

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